THE REVIEW

DEVOTED TO THE INTERESTS OF THE AMERICAN SOCIETY FOR METALS

Volume XII — JUNE, 1939 — No. 6

New England Chapters Hold Joint Meeting

Program Includes Golf, Plant Visits, Technical Papers on Copper and Stainless

By M. J. Donachie

The annual meeting of the New England Chapters was held on Friday, May 26, with headquarters at the Hotel Kimball at Springfield, Mass. With a program prepared in advance by the New England Council of the A.S.M. Chapters, Springfield acted as host to the Boston, Hartford, New Haven, Rhode Island and Worcester Chapters.

Early on Thursday evening the boys began to gather. There was a reunion of old friends and greetings to new ones who soon became old.

The program officially opened on Friday morning with much hustle and bustle. The golfers started off to test the wearing properties of their clubs by excavating the good earth around Springfield. The assemblage of visiting ladies was taken out to view the sights and scenery of the historic Connecticut Valley.

The plant visitations started early and ended late, the visitors taking full advantage of the opportunity to inspect the Springfield Armory, Moore Drop Forging Co., Westinghouse Electric & Mfg. Co., and Package Machinery Co. Many of the visitors managed a flying trip through all four places.

Technical papers were presented in the afternoon by C. H. Davis, assistant technical manager of American Brass Co., and F. B. Foley, superintendent of research of Midvale Co.

Mr. Davis delivered a paper on copper-base alloys with signal attention

(Continued on page 8)

Compliments

To **Hugh Brown**, chairman Cleveland Chapter, and his Executive Committee on the Chapter's contribution of $250 to the building fund of Case School of Applied Science.

To **Herbert F. Moore**, professor of engineering materials, University of Illinois, on his selection to deliver the Edgar Marburg Lecture of the American Society for Testing Materials on June 28 during the annual meeting in Atlantic City.

To **Gordon Hess**, on his promotion as head of the Houston territory for Republic Steel Corp.

To **A.S.M. Past President W. B. Coleman**, on his election as a director of the American Foundrymen's Association for three years.

To **Tom Moore** and his able committee for the expeditious planning and handling of the Middle Atlantic Chapters' Group Meeting on May 19.

To **Springfield Chapter Chairman Albert W. Morris** and the members of his Executive Committee for the splendid New England Regional Meeting on May 26.

Song Climaxes Festivities of Six Chapters

Above—Community Singing Under the Leadership of Don Sawtelle of the New Haven Chapter (Standing With the Orchestra, Second From Right) Was One of the Features of the New England Regional Meeting. At the banquet are National Secretary Bill Eisenman, Guest Speaker Frederick H. Payne, Springfield Chapter Chairman A. W. Morris, and Mayor R. L. Putnam of Springfield.

Right—Whatever the Idea Past National Trustee Henry Keshian Is Trying to Put Across, It Seems to Be Meeting With Considerable Skepticism on the Part of New Haven Past Chairman Fred J. Dawless. Photographs by Harry Harris of Boston.

Waterhouse Sketches Brief Biographies Of Sorby, Bessemer, Thomas and Dudley

By H. D. McCarty

Baltimore Chapter was addressed at the last meeting of the season by George B. Waterhouse, past president of the Society, and professor of metallurgy at Massachusetts Institute of Technology.

His very interesting talk was made up of brief biographies of famous men in the steel industry.

First came Sorby, who was born in Sheffield, England, in 1826. Sorby published his first paper on geology when but 21.

He soon became interested in the microscope, and after having met a man named Nicol in Edinburgh, who was studying crystals in minerals, he began his first studies of metallography, going from rocks to meteorites, and then to iron and steel sections examined under the microscope. (See July METAL PROGRESS for reprint of Sorby's original work).

The second man, perhaps a bit better known to the average layman, was Bessemer, who was born in England in 1813. He did not have much schooling, but was given a good mechanical education by his father.

The invention by which we all know him was not thought of until he was over 40. Up to then he manufactured various colored metal powders by a process he invented, and from this he made quite a sum of money. Bessemer also thought of a new type of shell which improved the accuracy and trajectory, and thus began his improvement in the steel of cannon and his bessemer process.

Next came Thomas, also born in England, who died at the early age of 34. This man was forced to go to work because of his father's death, and he had to attend night school to obtain an education. Nevertheless, he saved $4000 to further his research.

His work was applying the bessemer process to non-bessemer iron, and finally he worked out the basic bessemer process for steel. Besides all of this remarkable research work, he drew up all his own patents which forever protected his rights.

The last man, Dudley, was an American, and for quite some time was city engineer of Akron, Ohio. He studied rail transportation, and in 1883 invented the high T-section rail used throughout this country today.

The first of these rails was fabricated at Scranton, Pa., and the analysis changed to high carbon steel, which has been used ever since. These were sold to the New York Central lines, and Dr. Dudley's specifications still hold good.

Pitt Symposium Papers Prepared for Distribution

A symposium on "Machinability of Metals" held by the Pittsburgh Chapter of the Society on April 29 has been prepared in mimeographed form. A small supply of these pamphlets is still on hand, and H. L. Walker, secretary of the Pittsburgh Chapter, has announced that they can be purchased at a price of $1.25 each.

Requests for copies should be sent to H. L. Walker, P. O. Box 6621, North Side Station, Pittsburgh, Pa.

The titles and authors of the three papers in the symposium are as follows:

"Machinability From the Viewpoint of Metal Being Cut" by H. W. Graham, Jones & Laughlin Steel Corp.

"Materials for Cutting Tools" by J. P. Gill, Vanadium-Alloys Steel Co.

"The Influence of the Form of the Tool Upon Machinability" by M. F. Judkins, Firth Sterling Steel Co.

Program for Metal Congress Is Formulated

Symposium on Precipitation Hardening and Two Lecture Courses Scheduled

A symposium on "Precipitation Hardening of Metals", a lecture course entitled "Introduction to the Alloying Elements", and a second course on "Macroscopic Examination" will be prominent attractions on the technical program of the American Society for Metals during the National Metal Congress to be held in Chicago Oct. 23 to 27, 1939.

These features will be in addition to the regular program of scientific papers scheduled for morning and afternoon sessions during the five days of the Congress. More than 40 eminent research men and scientists have already definitely scheduled contributions, while many more are promised.

New Developments Featured

Papers will be given on such popular topics as hardenability, high temperature properties, grain size, failures and tests, and will also include discussion of such new developments as leaded steels, austempering and new X-ray microradiography.

The symposium on precipitation hardening will consist of 11 papers to be presented in four sessions. Following an introductory paper by Zay Jeffries, papers by well-known names in the field will discuss precipitation hardening of aluminum, copper, and nickel alloys, of steels and heavy alloys.

R. F. Mehl will conclude the session with a review and discussion of theory, while such men as Archer, Bain, Merica, and Scott will present prepared and written discussions.

Author of the five-day lecture course, now a popular institution of the annual Metal Congress, will be E. C. Bain, assistant to the vice-president, United States Steel Corp., and past president A. S. M.

Bain and Enos Are Lecturers

Under the general heading of "Introduction to the Alloying Elements" Dr. Bain will give five lectures on "Nature of the Systems With Iron", "Elements Dissolved in Austenite", "Carbide-Forming Elements", "Design of Alloy Steels for Different Uses", and "Review of Principles Involved".

A three-lecture evening course on "Macroscopic Examination" will be presented by George M. Enos, associate professor of metallurgy, University of Cincinnati. These talks will be a fundamental discussion of the subject, comprehensive but practical in nature.

Supplementing this intensive technical education will be practical demonstrations and exhibits of all that is new and interesting in the field of metals. More than 250 of the leading metal manufacturing and processing firms in the country will have exhibits at the National Metal Exposition held in conjunction with the Congress at Chicago's huge International Amphitheater.

The American Institute of Mining and Metallurgical Engineers, American Welding Society and Wire Association are cooperating with the A.S.M. in the National Metal Congress.

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RAY T. BAYLESS.....*Editor*
M. R. HYSLOP.....*Managing Editor*

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Krivobok Speaks at New York Chapter's "Sauveur Night"

By J. Z. Briggs

New York Chapter—The last regular meeting of the season was Sauveur Night. Appropriately enough, the speaker of the evening was V. N. Krivobok, who was associated with Dr. Sauveur for four years.

After a short but sincere tribute to Dr. Sauveur, Dr. Krivobok spoke on "Evaluation of Alloying Elements in Carbon and Complex Steels: Established Facts and Reasons".

First discussed was the effect of the elements per se on the structures of plain carbon steel.

Alloy Elements Evaluated

Elements that dissolve in and strengthen ferrite are: Al, P, Si, Mn, B (strong); Ni, Cr, Mo, W (medium); V, Cu (weak).

Elements that have a tendency to form carbides are: Cr, Mo, W, V, Ti, Cb (strong); Mn, Co (medium); P, Cu, Si, Al (no carbides formed); Ni (questionable).

The additional effect of the various elements in decreasing the eutectoid content, refining the structure and restraining grain growth, and conferring depth of hardening was discussed in detail.

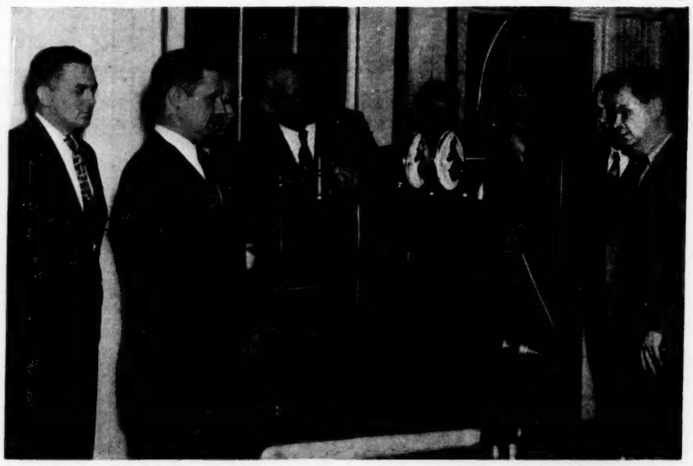
Characteristics of Carbides

Dr. Krivobok then took up the characteristics of the various carbides and their action on the properties of the steel such as resistance to softening at elevated temperatures, their relative stabilities, rates of solution in austenite, and tendencies to precipitate out of solid solution.

High mechanical properties at elevated temperatures are demanded by designers. Many engineers do not realize that high temperature tensile strength does not mean the same thing as room temperature tensile strength, because many additional factors enter the picture, such as effect of holding at temperature, possible transformations, structural constituents, and stability. The ultimate aim, of course, is to obtain a structure that is so stable that long holding at temperature will not change it, but the structure must also be one that will give a high elevated temperature strength.

At the conclusion of his talk, Dr. Krivobok dealt with hardenability and emphasized the value of this concept.

Calumet Members Visit Valve Company



Research Laboratories and Manufacturing Departments of the Edward Valve & Mfg. Co., East Chicago, Ind., Were Visited on Saturday, May 20, by Members and Guests of the Calumet Chapter. Viewing a special fatigue testing unit in the physical laboratory are members of the Executive Committee: Left to right—K. F. Schauwecker, Carnegie-Illinois Steel Corp.; Retiring Chairman O. W. McMullan, Youngstown Sheet & Tube Co.; E. P. Epler, Carnegie-Illinois; Dirk Dekker, Carnegie-Illinois; H. R. McCoy, American Steel Foundries; D. E. Wilson, chief metallurgist, Edward Valve & Mfg. Co.; F. S. Focht, Youngstown Sheet & Tube; and Incoming Chairman Floyd Sutherland, Continental Roll and Steel Foundry Co.

Second Talk on Hardness Testing Devoted To Consistent Determinations of Results

By J. W. McBean

Ontario Chapter—Some 2½ years ago V. E. Lysaght of the Wilson Mechanical Instrument Co. gave a talk on the operating characteristics of the various hardness testers. Returning this year to address the annual meeting in May, he devoted his talk especially to the factors which influence the proper determination of the hardness numbers, and to the securing of consistent results.

Conversion tables must be used with caution since the results are affected by the cold working properties of the metal, the homogeneity of the metal for several times the depth of the impression, by the shape of the penetrator and by the load used. These last two items should be specified in every test.

For a uniform material such as carbon steel, a fairly close relationship between, say, Rockwell C and Brinell numbers can be made by a specially prepared conversion table for the part being treated, but this table would not necessarily apply to other materials.

A large number of tests were made using the various standard and superficial Rockwell scales and the Brinell and Vickers scales. These were tabulated up to the exceptionally high value of Rockwell C-80.

Tungsten and tantalum carbide alloys were used to get these very high values, but to check the results high carbon steel was heat treated to as high as Rockwell C-70, and some of the tungsten carbide alloys were about Rockwell C-65. These results appeared to be fairly similar in the overlapping portion.

Chart Prepared for 12 Steels

From a chart carefully prepared for 12 different analyses of steel using the Vickers and Rockwell testers, it was shown that with ideal conditions the minimum deviation would be plus or minus one point on the Rockwell C scale. These deviations do not follow the analysis of the steel. For other conditions the deviations in the conversion chart would be much greater.

If very thin material, case hardened or nitrided steel is to be tested, special equipment such as the Rockwell superficial tester should be used. The readings can then be converted to the proper readings for the B or C scale.

A diagram showed very clearly the effect of the variation of the load in a Brinell tester from 500 to 3000 kg., which may be due to the geometry of the penetrator and the cold working properties of the material.

In a recent paper before the National Metal Congress by Howard Scott, however, the relation between diamond pyramid and Rockwell C tests did not appear to be much affected by the composition or heat treatment of the materials for loads between 10 and 50 kg.

Kenyon's Results Cited

R. L. Kenyon has drawn the conclusion that apparently three things affect the Rockwell readings on thin sheets:

1. Side flow, causing lower readings.
2. Anvil effect, causing higher readings.
3. Crushing effect or punching through, causing lower readings.

In a study on harder material, from C-20 to C-65, conducted by the Wilson Mechanical Instrument Co., it was found that the hardness did not vary much for the different thicknesses until a certain minimum thickness was reached for each of the four scales used, the A and C regular scales and the 15N and 30N of the superficial tester. At these points the side flow and anvil effect come into play but the specimens were not thin enough to be affected by punching through.

In production work increased speed is obtained by the use of motor-operated equipment, but the amount of time saved is limited by the speed limit for accurate results and by the time used in locating the specimen.

One of Mr. Lysaght's slides showed the new long, narrow, shallow diamond pyramid known as the Knoop Indenter, developed at the National Bureau of Standards at Washington.

This is particularly good for light loads, extremely thin cases or thin sheet. It has also been used to show the difference in hardness between the crystal and the bond in a metal and on glass and other brittle materials.

Future Air Records Will Not Startle New Jersey Men

By M. A. Hughes

New Jersey Chapter—The largest crowd of the year convened at the Essex House on May 15 to hear I. I. Sikorsky of the Vought-Sikorsky Aircraft Division of United Aircraft Corp., Bridgeport, Conn., speak on "Aircraft of the Future".

The speaker's introductory remarks concerning his early experiences as an airplane designer and builder were amusing and interesting. His first plane built in 1909, to quote Mr. Sikorsky, "had a ceiling of sea level". A year later, however, he met with better success when he flew for the first time. In 1913 he built and flew the first multi-motored plane.

The speaker then gave his opinions on our future airplanes with regard to their possible speed, altitude and size.

High Speeds Limited

The present speed record of 462 miles per hr. may possibly be increased to 500 or 600 by further intensive study in aerodynamics and better design. Higher speeds can probably only be obtained by an entirely different design as well as another source of energy and a different method of propulsion, possibly working on the principle of the rocket. The likelihood of such a ship being built in the near future is rather remote.

Mr. Sikorsky predicted that altitudes of between 75,000 and 100,000 ft. might be obtained but pointed out that there are many difficulties to be overcome. The present altitude records are 72,300 ft. for balloon and 57,000 ft. for airplanes.

Stratosphere Flying Discussed

Stratosphere or substratosphere passenger travel is not likely, according to the speaker. Although a 25% increase in speed might be obtained and ideally clear weather would favor such altitudes, disadvantages would be incurred in design and the necessity of many extra costly gadgets. There will, however, be an increasing amount of military stratosphere flying.

The speaker then brought the audience a little closer to the ground and launched into a discussion of the size of future ships. There is no sound reason why 1000-ton ships cannot be built and flown.

In concluding, the speaker predicted that we would be flying to Europe in 15 or 16 hr. in large, luxurious trans-Atlantic airliners in the near future. After hearing Mr. Sikorsky's lecture the entire audience was all prepared to make the first trip with him.

The lengthy and interesting discussion that followed was led by Chapter Chairman E. S. Davenport. The meeting was adjourned with a rising vote of thanks to Mr. Sikorsky.

Story of Car Wheels Given

By G. E. Healy

Oregon Chapter—At the meeting on April 7 G. S. Cortelyou of the Griffin Wheel Co., South Tacoma, Washington, was introduced by Mr. Peck. Mr. Cortelyou gave a very interesting talk in which he traced the discovery and development of chilled iron car wheels.

Standards of size and weight have been set up and through metallurgical research considerable improvement in operation has been attained.

Mr. Cortelyou exhibited a picture, "The Story of the Chilled Car Wheel", prepared by the Association of Manufacturers of Chilled Car Wheels, which illustrated in detail the manufacturing processes used.

Fundamentals of Metal Cutting Demonstrated

Slides and Movies Explode Preconceived Notions of Occurrences at Tool Edge

Southern Tier Chapter—The May meeting was held on the 15th at the I.B.M. Homestead, with 175 men attending.

Seated at the speakers' table during the dinner were W. J. Squire, chairman of the Southern Tier Chapter; H. F. Barnes, supervisor of manufacturing departments of International Business Machines Co.; C. F. Briggs, Cincinnati Milling Machine Co.; H. E. Reiniger, Henry F. Prentice Co.; L. C. Conradi, technical research director, I.B.M.; Leigh R. Evans, vice-president, Hardinge Bros., Inc.; C. F. McElwain, chief inspector, I.B.M.; Ward G. Lincoln, Ingersoll Rand Co.; H. E. Van Ness, superintendent, Eclipse Machine Co.; and the speaker of the evening, Hans Ernst, research director of Cincinnati Milling Machine and Cincinnati Grinders, Inc.

Speaker's Career Outlined

Introducing Mr. Ernst, Mr. Squire outlined his career, pointing out that he was born in Melbourne, Australia, and graduated from Melbourne Technical College in 1911. After coming to the United States in 1915 he spent eight years in research and machine development work connected with the manfacture of ammunition and sheet metal specialties. For the past 12 years he has been in charge of research and development for the Cincinnati Milling Machine Co.

Mr. Ernst gave to his talk the title "The Physics of Metal Cutting".

He pointed out that while progress can be made without fundamental knowledge it is necessarily a very slow process. Progress can be tremendously accelerated when this basic knowledge is acquired.

With a series of slides and two reels of motion pictures Mr. Ernst demonstrated the remarkable contribution that he and his associates have made in understanding the basic facts regarding metal cutting.

His pictures very cleverly exploded many preconceived notions as to what takes place at the cutting edge of a tool when metal is removed. He demonstrated the effect of coolants on the finish, showing that the selection of the best coolant for a particular job is of prime importance.

Part of the motion pictures were devoted to a color film which used photo-elastic models in polarized light to demonstrate very beautifully the stresses set up during the removal of metal by a tool.

Letter to the Editor

Comment on Notre Dame Chapter Metallurgical Experiments

To the Editor of THE REVIEW:

The overwhelming success of the April meeting of the Notre Dame Chapter, especially arranged to interest high school students, and the enthusiasm expressed by high school students and instructors, has led the Chapter to plan a repetition of such a meeting in the future.

Requests have also come to the Chapter to add various high schools to the list of those for whom Notre Dame Chapter has subscribed to METAL PROGRESS and THE REVIEW. At its May meeting the Chapter voted to increase the list of such subscriptions from seven to eleven. This list will then include almost the entire territory of northern Indiana and southern Michigan.

Whether or not such a venture will result in an increase in interest in metallurgical education—and, eventually, in metallurgical progress—is a matter which may be determined only by the developments of future years. At all events, the Notre Dame Chapter membership has demonstrated its faith in the experiment by voting to continue it and to expand the program.

The fact that nearly 600 high school students and instructors attended the April meeting, and that four more high schools have requested that the Society publications be sent to their libraries, would appear to be evidence that something is being accomplished in the direction of acquainting high school boys with the opportunities existing in the field of industrial metallurgy.

The average non-metallurgist knows something of mechanical, civil, chemical and aeronautical engineering, but "metallurgy" is a new term to him. We are trying to correct this situation.

E. G. MAHIN

Members Invited to Join A.S.M.E. Western Tour

Members of the American Society for Metals who are interested are cordially invited to join the tour to San Francisco sponsored by the American Society of Mechanical Engineers for its semi-annual meeting in that city July 10 to 15.

The tour starts from eastern points on June 28 and includes many interesting stops and side trips. The return route includes an optional trip to Alaska.

In addition to a complete program of technical sessions, time is allowed for visits to Treasure Island and other attractions in San Francisco.

Rates and details may be secured from American Society of Mechanical Engineers, 29 West 39th St., N. Y.

Seven Chapters Assemble for Middle Atlantic Group Meeting

Technical Session, Luncheon, Plant Inspection, Planetarium Visit and Banquet Feature All-Day Meeting in Philadelphia May 19

By A. O. Schaefer

Friday, May 19, dawned fair and clear for the multitude of Middle Atlantic Steel Treaters gathered in Philadelphia for the biennial group meeting. New York, New Jersey, Lehigh Valley, Baltimore, York, and Penn State all combined with Philadelphia to make the occasion a truly representative one for the area included.

The program began with a technical session at the Manufacturer's Club. H. J. French of the International Nickel Co. acted as technical chairman and introduced the speaker of the day, A.S.M. Past President Edgar C. Bain of the U. S. Steel Corp.

The subject of the address was "Functions of Some Alloying Elements in Steel". The speaker's intimate knowledge of the subject, and his uncanny ability to clarify his conceptions, were never displayed to better advantage. Norman L. Mochel of the Westinghouse Electric and Mfg. Co. voiced the sentiments of all when he expressed appreciation for the opportunity of hearing this talk.

The morning session was further distinguished by the presentation of scrolls to Mr. French, Dr. Bain, and Mr. Mochel in acknowledgment of the fact that they had been Sauveur Night speakers for the Philadelphia Chapter.

In anticipation that the afternoon's program would wind up at Valley Forge, Francis B. Foley delivered a paper on the history of Valley Forge as a site of an early iron or steel plant.

Then followed luncheon, served through the courtesy of the Philadelphia Electric Co., whose vice-president, George Whitwell, made some timely comments on the subject of enthusiasm.

William James, president of the Philadelphia Chamber of Commerce, welcomed all to Philadelphia.

Alan Wood Steel Co. Visited

And so into buses, and accompanied by the shriek of the sirens to Conshohocken and the Alan Wood Steel Co. Two alternate trips were offered the members at this plant. One group inspected the blast furnaces and coke ovens. Another went through the open-hearth and the rolling mills.

The trips were very well planned, competent guides escorted the groups, and many questions were anticipated in a very readable booklet describing the plant which was distributed.

The program then turned back to Philadelphia instead of on to the hills of Valley Forge, and from there made an extremely realistic trip to the moon in a rocket ship in the Fels Planetarium. Henry Butler Allen, director of the Franklin Institute and former chairman of the Philadelphia Chapter, welcomed the group on board ship.

The day ended, as days should, with a dinner. To be more explicit, with a dinner boasting Bill Eisenman as toastmaster.

Valley Forge Commemorated

Such a dinner could only be a success. Story followed story in amazing succession. Friend after friend was introduced and said a few words, or took a bow—Jim Gill, Haring of Alan Wood, Bradley Stoughton, Ed Bain, and then Dr. Hart, the speaker of the evening.

John R. Hart, rector of the Washington Memorial Chapel at Valley Forge, spoke on "The Message of Valley Forge". That message Dr. Hart took to be one of unity, and he made a stirring plea for tolerance.

But it's a long way back to York, Pa., or even to New York. And good times must always end. So adjournment came at about 9:30, and a number of tired but happy members crawled home.

Great Lakes Shipping, Graphitic Steels Discussed

By F. D. Steinway

Milwaukee Chapter—The April meeting was held at the Milwaukee Athletic Club with R. F. Malia, secretary of the Rivers and Harbors Commission, furnishing an interesting coffee talk on "Deep Water Shipping From the Great Lakes".

Mr. Malia described the proposed Great Lakes-St. Lawrence Waterway, and showed the importance of this development to the Middle West in general. Most of the obstacles in the path of this project have been overcome, and the realization of this endeavor should soon be complete.

"The Development and Application of Graphitic Steels" was the topic of the technical speaker, F. R. Bonte of the Timken Steel and Tube Division of the Timken Roller Bearing Co. Details of the development of this material have been given in previous reports of Mr. Bonte's talk.

Graphitic steels combine the advantages of cast iron and steel in high resistance to wear, good frictional properties, machinability, ease of hot and cold working, response to heat treatment, good physical properties.

Among the many uses to which these alloys are particularly adapted are cylinder sleeves, gages, spindles, dies, and tools for cold metal forming, brake drums, and seamless tubing.

Highlights of Luncheon, Presentation of Scrolls During Middle Atlantic Gathering

Left: E. C. Bain, W. S. Haring, Bradley Stoughton, and A. Spillman During the Luncheon at the Manufacturers' Club. Center: Presentation of scrolls to Sauveur Night Speakers Bain, Mochel, and French. Right: Henry Allen, H. J. French, W. H. Eisenman, J. P. Gill, and G. Whitwell.

North West Sends 127 on Duluth Tour

North West Chapter—An all-day tour to Duluth, Minn., attracted 127 members and guests to the 20th annual meeting on May 24. Chartered buses left Minneapolis and St. Paul at 7:00 a. m. for an inspection trip through the plant of the American Steel & Wire Co. at West Duluth.

Members and guests were given the privilege of inspecting a steel plant in operation, including the wire mill, open-hearth furnaces, blooming mill soaking pits, 40-in. and 26-in. mills, roll shop, rolling end of merchant mill, fence post department, rod mill, and machine shop.

At noon the company was host to the party at a substantial luncheon in the company's cafeteria. The group was briefly welcomed by H. H. Lumley, general manager.

After the inspection trip, which consumed most of the day, the party again drove by bus to Hart's Coffee Shop at Moose Lake, Minn., where dinner was served at 6:30 p. m.

At the annual meeting after dinner, reports for the past year were presented by the officers, and a new slate of officers elected.

The trip was most enjoyable and everyone was impressed with the way the arrangements were carried out under the direction of the special committee consisting of Gladstone C. Hill, chairman, R. M. Hortvet, E. Willard Pennington, and Robert C. Weed.

The party returned to Minneapolis and St. Paul by bus, arriving at approximately 11:00 p. m.

Bates Predicts Greatest Advances in Al and Mg

By Anthony C. Kowalski

Worcester Chapter was privileged to hear A. Allan Bates, manager of the chemical and metallurgical division of the Westinghouse Electric and Mfg. Co., in a talk which dealt chiefly with the fundamentals of metallurgical engineering.

Aluminum and magnesium are the metals which, Dr. Bates predicted, will make the greatest strides in metallurgy in the future. Their relative abundance on the earth and high ratio of modulus of elasticity to density make them of great value to future engineering construction.

The enormous strength of some plastic materials was also disclosed in the lecture, but Dr. Bates doubts that they will extensively supersede the metals in usage.

The annual meeting was held previous to the lecture and officers elected. The announcement was made that this year's outing would be held on June 24 at Edgemere Lodge. All members and friends are cordially invited.

Do You Have A Copy Of This Book?

FORGING HANDBOOK

by Waldemar Naujoks and Donald C. Fabel

This book is more than a handbook on forging methods and forgings. It is a valuable reference on forged metals—their proper use, physical properties and production records.

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McQuaid Talks On Commercial Heat Treating

Reminisces on Early Days in Night Shift of Heat Treating Department

By Walter M. Saunders, Jr.

Rhode Island Chapter—It has been several years since H. W. McQuaid, assistant chief metallurgist, Republic Steel Corp., was a speaker before this Chapter, but his long-delayed return on April 5 attracted a large gathering of members and guests.

The talk was entitled "Factors Affecting the Results Obtained in Heat Treating Commercial Steels", and in addition to presenting valuable data on, and explanations of, the hardening of steels, much entertainment was furnished by Mr. McQuaid's reminiscences of his early days in heat treating when he was a foreman working on a night shift.

Seventeen to 19 cents an hour for 12½ hours a night, seven nights a week, with a bar bill at the end of each week of $3 to $10, was the lot of most of the workers in the department then. Mr. McQuaid stated he received the princely sum of 35¢ an hour, but admitted no deductions at the neighborhood bar.

Covers Large List of Topics

Illustrating his talk with slides, Mr. McQuaid discussed in considerable detail critical cooling rates; carburizing times and penetration of carbon; effects of melting and ladle treatments on hardenability; quenching and grinding cracks; and finally, notch sensitivity and fatigue.

Such a list seems rather imposing for one short evening, but each topic was adequately discussed, and as Mr. McQuaid said, "in language that even a salesman could understand".

Mr. McQuaid showed that alloy content does not increase hardness over that attained by plain carbon steels, but alloys make it easier to reach the desired hardness. Of particular interest was his statement that above 1.50% carbon, steel wears as well in the normalized condition, as if it is quenched and drawn.

Carburizing Curves Shown

Regarding carburizing, curves for case depth versus carburizing time at different temperatures between 1550 and 1800° F. showed that the case depth in a given time was directly dependent on the temperature.

At low temperatures, the diffusion rate of carbon from the surface inward is slow, with the result that carbon piles up in the surface zone. Such a condition is taken advantage of for better wear resistance in some gears which are purposely carburized at a relatively low temperature, thus giving high carbon on the surfaces.

Jominy Test Praised

The Jominy test for hardenability received the highest praise from Mr. McQuaid, because he feels that for a single test it shows the most about the steel. In addition to analysis and grain size, the treatment of the steel in the ladle and furnace practice are just as important in producing a material of desired hardening characteristics, as determined by the Jominy test.

It is interesting that some customers demand a fine-grained steel of maximum hardenability for the identical application that others believe requires a steel of minimum hardenability. It was Mr. McQuaid's contention that aluminum oxide in the steel does not govern the hardening characteristics.

Numerous examples of grinding and quenching cracks were excellently illustrated, and figures given for impact strength of the same steel with notches of varying radii.

Lack of rigidity of machine tools was advanced as a cause of poor life of gears.

Finally, Mr. McQuaid stated that the new leaded steels seem to show superiority in machining only when lead is added to the steels that are usually considered dirty. He could see no marked improvement in clean steels.

As coffee speaker, "Tuss" McLaughry, famed coach of the Brown University "Iron Men" of a decade ago, and still coaching at Brown, talked on "College Athletics". As it turned out, a better subject could not have been chosen, because next to football, Mr. McQuaid stated that steel metallurgy was his second choice.

Pittsburghers Tramp 50 Acres Inspecting Mills of Irvin Works

By A. W. Demmler

Pittsburgh Chapter started off the May meeting with an afternoon trip on May 11 to the Irvin Works of the Carnegie-Illinois Steel Corp. With just a trifle over a square mile of ground and some 50 acres under roof, quite a few of the "trippers" sought soft seats and relaxation before dinner and the evening meeting.

It's a strange fact one can get very tired looking around in the other fellow's plant. Nevertheless everyone thoroughly enjoyed seeing the hot strip mill and the several cold reduction mills as well as the tin house; best of all, practically everything was running and members were free to look wherever they pleased.

The speaker of the evening was W. F. McGarrity, chief metallurgist of the Irvin Works, who made an interesting presentation of "Hot-Rolled and Cold-Reduced Sheet Steel". Rimmed steel is, of course, the chief material going into these products and aging of cold-reduced sheet must always be borne in mind along with temper rolling, roll leveling, etc.

Ahead of the cold mill, the finishing temperature of the hot strip with the amount of reduction in the last stand must be critically controlled. Sometimes it almost seems as though the deep drawing fraternity lies awake nights making problems for the strip men to worry over; such aging is probably strain-aging of a dual type.

On the other hand, the very nature of tin mill operations results in a fully aged product.

After a good discussion, the meeting closed with everyone feeling that his afternoon and evening had been spent very advantageously.

Optics Institute Described

The Institute of Optics of the University of Rochester has recently published a brochure describing its activities and purposes.

The book tells in an interesting manner and with many excellent photographs the story of how this unique educational institute is fitting young men for a broad new field of opportunity. Substantial contributions to its establishment have been made by Bausch & Lomb Optical Co. and Eastman Kodak Co.

Details about courses, credits and student life may be obtained by writing the Director, The Institute of Optics of the University of Rochester, Rochester, N. Y.

HERE AND THERE WITH A.S.M. MEMBERS

INCUMBENT of a new fellowship in Mellon Institute, Pittsburgh, established by Wm. B. Scaife & Sons Co., is H. L. ANTHONY, III. The purpose of the fellowship is to conduct scientific research on problems pertaining to processes of fabricating and to the use of metal tanks, pressure cylinders, and water softening equipment.

Dr. Anthony's professional metallurgical education was long and intensive. Graduating from Lafayette College with a B.S. in 1930, he held a U. S. Bureau of Mines fellowship at University of Alabama and emerged with his M. S. degree in 1931. For the next year he was instructor in mining and metallurgy at Lafayette College. He then went to Harvard, and won his Sc.D. in 1935.

He was first employed in the metallurgical department of the Carnegie Steel Co. at Homestead, Pa., and then entered the research laboratory of the Midvale Co. in Philadelphia. From 1936 until he joined Mellon Institute, he was in the Midvale melting department and also taught evening courses in metallurgy at Temple University.

* * *

A NOTEWORTHY addition to the staff of Battelle Memorial Institute, Columbus, Ohio, is A.S.M. Trustee SAMUEL L. HOYT, formerly director of metallurgical research for A. O. Smith Corp., Milwaukee. At Battelle Dr. Hoyt will act as technical advisor in the planning and conduct of metallurgical research.

S. L. Hoyt

Dr. Hoyt is known particularly for his leadership in the development of cemented tungsten carbides for cutting tools and for his work on temperature resistant alloys.

A graduate of Minnesota School of Mines, Dr. Hoyt subsequently studied at Columbia University (Ph.D. 1914) and at the Charlottenburg Technical School, Germany. He organized the department of metallography at the University of Minnesota and headed it from 1913 to 1919.

In 1919 he was employed by the General Electric Co. as metallurgical engineer in the incandescent lamp department at Nela Park, later transferring to the research laboratory at Schenectady. His momentous research there on tungsten carbide is now important history.

Since 1931 he has been with the A. O. Smith Corp., his work there including the successful development of an iron-chromium-aluminum heat resistant alloy known as Smith Alloy No. 10.

* * *

RICHARD RIMBACH has been appointed technical advisor to R. C. Enos, president of Standard Steel Spring Co., of Coraopolis, Pa.

R. Rimbach

Mr. Rimbach will work on the development and promotion of a new process for coating steel which has successfully demonstrated its resistance to severe corrosion conditions in the Texas oil fields.

He was formerly director of research, Standard Steel Car Co., editor of *Metals and Alloys*, and more recently consulting metallurgical engineer. He is also supervisor of the extension and evening courses in metallurgy at Carnegie Tech.

Left: Past Chairman W. B. Coleman, "Dad" Metzger, Present Chairman A. O. Schaefer. Right: Washington's Heuster and Philadelphia's Coleman

GEORGE METZGER undoubtedly holds the record among A.S.M. members for length of service with one company —70 years with Henry Disston & Sons. Philadelphia Chapter challenges any other chapter to produce a photograph of a member as youthful looking who can boast of a similar accomplishment. He is shown being congratulated by Philadelphia Past Chairman COLEMAN and Retiring Chairman SCHAEFER on Past Chairmen's Night, April 28.

Snapped at the same meeting is HARRY HEUSTER, now a member of the Washington Chapter. Harry served under Bill Coleman in 1925 when the latter was chairman of the Membership Committee. Bill reports that his results were phenomenal—he ended up with at least 25 or 30 new members to his account.

* * *

RECENTLY appointed metallurgical engineer of the Copper Iron and Steel Development Association with headquarters in Cleveland, T. E. BARLOW will act as technical service representative of the association of copper producers. The work will help direct the increasing tonnage of copper employed in iron and steel to the best possible advantage.

Since 1936 Mr. Barlow has been a research engineer at Battelle Memorial Institute, where most of his work centered on the use of copper in steel and cast iron. A graduate of University of Michigan, he was chief metallurgist of a large automotive jobbing foundry in Detroit before joining the Battelle staff.

* * *

REVERE Copper and Brass, Inc., has announced the appointment of C. H. KUTHE as technical advisor to the Michigan Division.

Mr. Kuthe is an alumnus of Case School of Applied Science, graduating as a B.S. in Mechanical Engineering in 1932, and securing his M.E. in 1937. He has been with the Steel and Tube Division of Timken Roller Bearing Co. since graduation, first as engineer in the development and manufacture of steel tubing, and later as sales engineer in the Philadelphia District.

* * *

ANNOUNCED at the spring meeting of the Electrochemical Society in Columbus, Ohio, was the award of the 1939 Edward Goodrich Acheson gold medal and a $1000 prize to FRANCIS C. FRARY, director of research of Aluminum Co. of America.

F. C. Frary

Dr. Frary, who was president of the Electrochemical Society in 1930, will receive the award for distinquished contributions to the electrometallurgy of aluminum, as well as to other scientific fields.

Before joining Aluminum Co. of America Dr. Frary was professor of chemistry at the University of Minnesota and later research chemist of the Oldbury Electrochemical Co., Niagara Falls, N. Y.

* * *

N. M. BURNS, salesman for Universal-Cyclops Steel Co., Bridgeville, Pa., has been seriously ill for some time. His fellow members of the Pittsburgh Chapter and friends everywhere are wishing him a speedy recovery and convalescence.

* * *

CLIFFORD W. SCOTT, vice-president and general manager, C. U. SCOTT & Son, Rock Island, Ill., died April 18 of pneumonia. His father, C. U. Scott, is president of the firm.

Many Variables Affecting Machinability Hamper Better Understanding of Subject

By Walter G. Patton

Detroit Chapter concluded its 1938-39 technical meeting season at the Fort Shelby on May 8 with a talk on "Machinability" by J. D. Armour of the Union Drawn Steel Division, Republic Steel Corp.

Despite the mid-summer temperature prevailing, more than 200 members turned out to hear Mr. Armour's paper and see two talking pictures. One described the plant and steel making operations at the vast Uddeholm Works in Sweden; the second picture was the Dodge Automobile talkie, "Thrill Hunters".

Prof. O. W. Boston of the University of Michigan served as technical chairman and presented the speaker.

In discussing the problem of machinability, Mr. Armour pointed out that a great many variables must be considered, including, for example, even the mechanical aspects of the machine such as bearings and vibration. Variables introduced by the tool itself would include the types of tool, angles to which it is ground and its heat treatment.

After adding other commonly recognized variables such as cutting fluids and the material to be cut, Mr. Armour observed that the problem seems not to lend itself to any sound scientific approach and this probably accounts for our lack of a better understanding of the subject.

In order to study the problem, Mr. Armour has set up an automatic screw machine operation in which, as far as possible, variables introduced by the cutting machine, cutting fluid and tools have been eliminated.

By maintaining this fixed set-up, the speaker has been able to vary over a wide range the material to be cut and thus study the effect of the chemistry of steel on machinability as well as such other factors as microstructure, hot and cold working and the presence of special alloying elements, including additions of lead.

The speaker made the following observations based on these studies.

The ideal machining steel would be a material which had both low strength and low ductility. Carbon content would probably be in the range of 0.15 to 0.25% since both lower and higher carbon introduce machining difficulties.

Both manganese and phosphorus affect strength and ductility and must be closely controlled if machining properties are not to be sacrificed.

Sulphur, on the other hand, has no appreciable effect on either strength or ductility. Increasing sulphur content greatly aids machinability and this element should be maintained at the highest level which is consistent with quality requirements.

Forging grain size was also discussed as a factor in machinability. The speaker was careful to differentiate between this grain size and the grain size as disclosed by the McQuaid-Ehn test.

Cold working, like carbon, manganese and phosphorus, increases strength and decreases ductility. The beneficial effects of cold working are believed to result from slips in the ferrite which tend to build up amorphous layers. These in turn help support the ferrite during the machining operation.

The most readily machinable microstructures, Mr. Armour contends, are lamellar pearlite and, at high carbon contents, spheroidized cementite. Where thermal treatment is used to improve machinability, the aim of the heat treater should be to produce one or the other of these desirable microstructures.

The introduction of special alloying elements in substantial quantities has a significant effect on machinability since the carbide-forming elements behave in much the same manner as carbon while the solid solution-forming alloys serve to strengthen and toughen the ferrite.

It may also happen that the presence of solid solution elements may make difficult the formation of lamellar pearlite and, in such cases, resort to cold working rather than thermal treatment is advisable to produce a desirable structure.

In Mr. Armour's experience, the presence of lead, when adequately distributed, results in improvement by 30% of machining feeds and speeds. The speaker told his audience that lead additions are not a cure-all for machining problems and he was inclined to the belief that the benefits of lead are best considered as a superimposed effect, over and above the usually satisfactory machining properties available as a result of carefully selected and controlled chemistry and a lamellar pearlite or spheroidized microstructure.

FOR SALE

Leitz small metallurgical microscope model "MC" with camera, built-in 6-volt illuminating device, object stage with mechanical movements, complete optical equipment including fluorite oil immersions, vibration absorber. Good working order.

List value over $500—will sell for $250.

Spindler & Sauppe, Inc.
86 Third St., San Francisco, California.

Helpful Literature — Mail Coupon Below

Heat Resisting Alloys—Authoritative information on alloy castings, especially the chromium-nickel and straight chromium alloys manufactured by General Alloys Co. to resist corrosion and high temperatures. Bulletin D-17.

Columbium—"Advantages of Columbium in Wrought 4 to 6 Per Cent Chromium Steel" is the title of a booklet which gives detailed test data to prove its advantages. Electro Metallurgical Co. Bulletin Cc-16.

Tocco Process—This amazing and extremely accurate method of heat treating is described in a four-page leaflet, yours for the asking. Distributed by Ohio Crankshaft Co. Oy-145.

Furnace Experience—Facts developed through 32 years of engineering and building practically every type of industrial fuel equipment can be obtained through Flinn & Dreffein Co. Bc-82.

Vacuum Cleaning—A very colorful brochure which illustrates modern cleaning methods by vacuum in industrial plants has just been released by The Spencer Turbine Co. Dc-70.

Molybdic Oxid—A new product just placed on the market by the Climax Molybdenum Co., Molybdenum Oxide Briquettes, are described in a pamphlet released recently. Bulletin Ec-4.

Alloy Castings—Calite chromium-nickel alloy castings for furnace roller rails are pictured and described in a release by the Calorizing Co. Bulletin Ec-26.

Electric Furnaces—"Certain Curtain" electric furnaces for heat treating all types of tool steel —1200 to 2500° F.—are shown in a bulletin by C. I. Hayes, Inc. Bulletin Ec-15.

Metal Powders—An attractive booklet containing analyses of metal powders and screen sizes is published by Metals Disintegrating Co. Bulletin Ec-208a.

Plastic Testing—Modern plastic material testing machines have been completed by Tinius Olsen Testing Machine Co. and are described in a colorful booklet just released. Bulletin Ec-147.

Heat Treating Furnaces—A brand new 16-page booklet of Holcroft & Company shows and describes their line of controlled atmosphere heat treating furnaces. Bulletin Ec-203.

Laboratory Service—A new edition of "The Metal Analyst" tells about an organization established by Adolph I. Buehler specializing in the installation of metallurgical laboratories. The complete line of laboratory equipment marketed by Buehler is also catalogued. Dy-135.

Complete Pyrometer Unit—Bulletins describing complete pyrometer units with accessories for one initial cost have been released by the Lewis Engineering Co. Bulletin Ec-227.

Industrial Furnaces—Furnaces of all types are fully described in technical bulletins made available by the Eclipse Fuel Engineering Co. Bulletin Ec-226.

Cutting Oils—An interesting new booklet "Metal Cutting Lubrication—In Theory and Practice" has just been made available by Cities Service Oil Co. Bulletin Ec-113.

Steel Publication—A deluxe magazine "Steel Horizons" dealing with new developments in steels is available through the Allegheny-Ludlum Steel Corp. Bulletin Ec-92.

Instruments—A new general catalog including machine tools, instruments and machinery made by George Scherr Co. contains several items being shown in the U.S. for the first time. Bulletin Ec-206.

Dehumidifier—Lectrodryer systems, employing activated alumina for drying air and gases by absorption, are described in an attractively illustrated booklet by the Pittsburgh Lectrodryer Corp., Pittsburgh. Bulletin Bb-187.

Bimetal—Interesting facts about thermostatic bimetal are contained in an extremely well-prepared book by W. M. Chace Valve Co. Applications, forms available, and how the material acts in temperature control devices are given. Bulletin Ec-232.

Duraloy—Duraloy chrome-iron, chrome-nickel and nickel-chrome alloys for resisting temperature, corrosion and abrasion are described in an illustrated pamphlet by the Duraloy Co. A handy table compares the properties and characteristics of the various types. Bulletin Ec-233.

Strenes Metal—A colorful folder gives the story of Strenes Metal, a new and unique material that is a chromium-nickel-molybdenum alloy with a high steel base, used primarily for cast-to-shape forming and drawing dies. Advance Foundry Co. Ec-231.

Cutting Components—Of special interest in the new booklet distributed by E. F. Houghton & Co. is an article detailing the function of sulphur in a cutting oil. Bulletin Ec-38.

High Temperature Combustion Furnaces—Single and double tube laboratory furnaces, provided with Globar elements producing temperatures up to 2500° F., are described in a bulletin of Burrell Technical Supply Co. Bulletin Ec-213.

New High-Strength Steel—This little book gives facts and figures on DYN-EL, a new high strength, flat rolled steel claimed to have unusual resistance to fatigue, impact and corrosion. Complete fabricating and design properties and table of sizes and weights are included. Alan Wood Steel Co. Bulletin Ec-225.

Brazing Furnace—If you have a brazing problem you will be interested in the worthwhile folder issued by Hoskins Mfg. Co. Ec-24.

Burners for Industrial Furnaces—This illustrated, 4-page folder is devoted to the new Duradiant burner whose outstanding feature is a refractory burner tip. Chamber temperatures from 3000 to 2400° F. can be produced. Selas Company. Bulletin Ec-214.

Gases for Bright Annealing—Bulletin gives details concerning the Industrial Carburetor, heart of the Atmos-Gas producer, shows types of installations and gives useful tables. C. M. Kemp Mfg. Co. Bulletin Ec-219.

Arc Welders—The three types of Marquette a.c. arc welders, in ranges up to 250 amps., are illustrated and described in this folder. The machines feature streamlined design and 15 taps on the front panel which provide a wide choice of welding amperage. Marquette Mfg. Co., Inc., Minneapolis. Bulletin Ec-216.

Tensile Tester—A new tensile testing machine for wire, sheet metal and other small-size samples is described in a new bulletin. The machine is claimed to be simple, rugged and unusually accurate; an automatic recorder plots stress vs. strain and permits quick determination of yield points, total elongation, etc. Henry L. Scott Co. Bulletin Ec-217.

Super Refractories—A catalog of Chas. Taylor Sons Co. is replete with useful data on P. B. Sillimanite refractories for use up to 3300° F. in electric furnace roofs and linings, induction furnaces, crucible furnaces, fuel-fired hearths, piers and linings, burner blocks, etc. Ec-218.

Dowmetal Data Book—A new edition, containing especially significant accomplishments in the sections on "Available Forms" and "Shop Practice" has been published by Dow Chemical Co., Dowmetal Div. Bulletin Ec-215.

Rust Preventative—A rust preventative which succeeds when others fail is described in literature made available by the Simoniz Co. Cc-94.

New Copper Alloy—Mallory 333 metal, a new copper-chromium-lithium alloy, described as combining hardness with high conductivity, is useful for welding electrodes and other applications, according to a bulletin of P. R. Mallory & Co. Bulletin Ec-220.

Welding Contactor—The Weld-O-Trol, a Westinghouse ignitron a-c welding contactor without timing, is described in a new leaflet released by Westinghouse Electric & Mfg. Co. Ec-134.

Industrial Compressors—Small industrial compressors and vacuum pumps, from ¼ to 15 h.p., are covered in a bulletin which gives complete rating tables of more than 50 models. Ingersoll-Rand Co. Bulletin Ec-222.

Electric Forging Heaters—Berwick heaters employ the direct electric resistance method to heat the metal, and feature temperature control by photocell. Advantages claimed are speed, uniformity, absence of distortion, and economy. American Car and Foundry Co. Bulletin Ec-223.

High Temperature Insulation—An illustrated leaflet is devoted to types and uses of thermal insulation, for all types of heating equipment. Armstrong Cork Products Co. Bulletin Ec-221.

Refining Slag—Purite made by Mathieson Alkali Works is stated to reduce metal shrinkage and casting losses and to improve general quality by forming a protecting and refining slag. Composition, general instructions for use, and directions for use with various furnaces are given in Bulletin Ec-224.

High-Strength Steel Data—Complete mechanical property data on Ductiloy, a new low-alloy, high-strength steel, are given for strip, plate and bars in a folder of Great Lakes Steel Corp. Bulletin Ec-229.

Portable Hardness Tester—The "Telebrineller" is described in a new bulletin as a simple, rugged, flexible instrument that accurately determines Brinell hardness of surfaces and objects inaccessible to conventional testers. Total weight, 6½ lbs. Teleweld, Inc. Bulletin Dc-98.

Valcase—Chapman Valve Co. has a fused salt bath mixture known as Valcase which forms a perfectly balanced and economical carburizing bath. A folder gives instructions for handling and use and typical results obtained. Na-80.

Cleaning Processes—An attractive 12-page booklet entitled "Scientific Metal Cleaning" has been published by Detroit Rex Products Co. It describes in detail the applications and advantages of Detrex degreasing with Perm-A-Clor or Triad Safety Solvents and the applications of Triad Alkali Cleaning Compounds and Strippers. Bulletin Oy-111.

X-Ray Diffraction—A new high-precision unit for X-Ray diffraction is described in a booklet issued by General Electric X-Ray Corp. Ec-6.

Welding Accessories—A full line of arc welding accessories is shown and described in a booklet released by the General Electric Co. Bulletin Ec-60.

Scale-Free Hardening—Complete information on equipment to assure precise heat treatment, eliminate scale, reduce costs, and improve working conditions is contained in a publication by General Electric Co. on conveyor-type electric furnaces for use with protective atmosphere for scale-free hardening. Bulletin Bb-60.

Non-Ferrous Pyrometer—A pyrometer which can use either "bare" or "protected" thermocouples on non-ferrous metals is described in an interesting folder released by the Pyrometer Instrument Co. Elements are interchangeable within a second and maximum and true temperature indication is reached within a few seconds. Bulletin Cc-37.

Cleaning Rooms—A catalog of designs for blast cleaning rooms incorporating many labor and time saving improvements making the blast room an unequalled mechanical device for low cost cleaning is published by Pangborn Corporation. Bulletin Ca-68.

Corrosive Solutions—A catalog by Duriron Co. covers a complete line of equipment for handling corrosive solutions, with information as to sizes, capacities, dimensions and engineering data for innumerable items. Bulletin Ka-152.

Monel and Nickel—An exhaustive study of Monel Metal and Nickel is contained in a 20-page booklet issued by the International Nickel Co. Well illustrated by pictures of these metals in actual use. Bulletin Eb-45.

Modern Metallograph—Bausch & Lomb research metallographic equipment, which is arousing so much interest and favorable comment in the profession, is the subject of literature recently issued. Bulletin Ba-35.

Calculator—A handy gadget is a sliding weight calculator which can compute weights per lineal inch of steel for 161,200 cross-section. Pocket-size, it contains tables for rounds, hexagons, octagons, squares and flats. Distributed by Heppenstall Co. Bulletin Ea-122.

Model "Y"—The Sentry Model "Y" electric furnace, using the Sentry Diamond Block method of heat treatment provides exceptional quality high speed steel hardening at minimum production cost. Described in Bulletin Oy-114.

Sponge Iron—A Bureau of Mines report gives some interesting data on vibration damping capacity of steels made with Swedish sponge iron as raw material. Ekstrand & Tholand, Inc., has copies for distribution. Bulletin Kb-202.

Correct Alloys—A four-page folder pointing out the importance of correctly designed metallurgical alloys which fit the needs of product and process has been published by the Titanium Alloy Manufacturing Co. Also points out the importance of the spectrograph. Bulletin Db-90.

Durodi—Durodi . . . "The practical, serviceable and economical hot work steel" . . . is described in a catalog issued by A. Finkl & Sons Co. Points out uses and characteristics of this alloy. Bulletin Ib-23.

Stressproof—A new Cold Finished Bar is introduced in a colorful booklet released by the LaSalle Steel Company. Well illustrated, the booklet also contains tables showing substantial savings made by the use of this new steel. Bulletin Lb-52.

Colmonoy—The high resistance to wear and corrosion which distinguishes Colmonoy alloys and overlay metals is explained in a 4-page catalog released by Wall-Colmonoy Corp. Bc-85.

Annealing Atmospheres—An entirely instructive article "Controlled Atmospheres for Copper" has been made available through Continental Industrial Engineers, Inc. Dc-154.

Hydryzing—Hydryzed work is completely described in recent literature released by Lindberg Engineering Co. Points out advantages in particular applications. Bulletin Bc-66.

Tool Steel Selector—A wall chart, 30 x 20 in., to be used as a means for selecting the proper type of tool steel is offered by Carpenter Steel Co. to tool steel users in the U.S.A. only. Jz-12.

Die Steel—Correct treatment for die steel is thoroughly described in literature issued by William Jessop & Sons. Interesting to stamping-die makers, especially. Bulletin Cc-61.

Spring Coiler—Sleeper & Hartley's new segment type spring coiler speaks for itself in a new bulletin. Thirteen points of superiority are carefully explained and illustrated. Complete specifications are given. Bulletin Bc-73.

Electric Tempering—The American Electric Furnace Co., model AO-1, is an ideal unit for tempering individual pieces or production quantities of small parts up to 1200° F. Described in Bulletin Fa-2.

Welding Stainless—How to weld stainless steels is described in a colorful 12-page folder released by the Page Steel and Wire Division of American Chain and Cable Co., Inc. Cc-86.

Ground Shafting—A colorful folder describing Ground Shafting made by Bliss & Laughlin, Inc., is now available through this company. Pictures steps in shafting production. Bc-42.

Heat Treating Line—An attractive catalog of heat treating products is published by Park Chemical Co. It starts out with a very useful diagrammatic thermometer showing the temperature and ranges for the various heat treating, melting and other processes requiring heat. Bulletin Oy-141.

Hydraulic Tester—Of interest to all engineers recommending or purchasing universal testing machines is a book by Riehle Division of American Machine and Metals, Inc., on the development of the precision hydraulic testing machine. Bulletin Ba-157.

Carburizing Salt—A technical service bulletin describing a new development—DuPont Carburizing Salt—for the economical production of deep high-carbon cases on plain carbon and alloy carburizing steels . . . available through DuPont. Bulletin Dc-29.

Carburizing Compounds—Aerocarb Carburizing Compounds, the new development of the American Cyanamid & Chemical Corp., are described in Bulletin Dc-148.

Lead Bearing Steels—New bulletin describing remarkable new lead-bearing open-hearth steels which improve machinability from 20 to 40% and increase tool life without sacrificing desirable quantities of OH steels has been released by Joseph T. Ryerson & Son, Inc. Dc-106.

Multi-Point Pyrometer—The Alnor Rectangular Type Pyrometer, designed to provide a rugged moderately priced instrument with multi-point switch is described in a release by the Illinois Testing Laboratories, Inc. Dc-180.

Stainless Electrodes—An attractive silver and black Wall Chart packed full of useful information for the welding fabricators of stainless steel and special alloy metals can be obtained through Arcos Corp. Write early since limited supply available. Bulletin Dc-191.

Heat Resisting Castings—A 4-page folder on Pyrasteel, heat resisting castings, that shows applications of special alloy steels and their analyses, also information on welding alloy steels, is available through Chicago Steel Foundry Co. Bulletin Cb-184.

Duronze III—A technical bulletin covering Duronze III, a patented high strength silicon-aluminum bronze, has just been released by the Bridgeport Brass Co. Describes typical uses and shows comparative tables. Ac-163.

Heat Treating Guide—A convenient guide for heat treating Columbia Tool Steels is now available in a bulletin published by Columbia Tool Steel Co. This device with revolving index shows grades, types, analyses, heat treating temperatures and Rockwell hardnesses. Bulletin Cc-115.

Electric Control—A complete control system for regulating input in proportion to demand is described in "Micromax Electric Control," an illustrated eight-page catalog issued by Leeds & Northrup Co. Bulletin Oy-46.

Continuous Heat Treating—First literature available on their No. 29-F Heating Machine is now available through the American Gas Furnace Co. Shows picture of machine and gives operating data. Bulletin Bc-11.

Heat Resisting—A striking booklet by Driver-Harris Co. has some interesting information and photographs of heat resisting alloys for heat resisting applications. The company makes a wide variety of parts from Nichrome, Chromax and Cimet. Bulletin Cb-19.

Tool Steels—Information about the fine steels made by the Uddeholm Company of America, Inc., can be obtained by requesting their new bulletin. This company controls its output completely from the ore mine to the consumer. Bulletin Eb-196.

Recording, Control Equipment—Now available from Baldwin-Southwark Corp. is a new 16-page bulletin illustrating and describing Southwark's complete line of stress-strain recorders and extensometers. Bulletin Bc-67.

Mo-W High Speed—J. V. Emmons, metallurgist for Cleveland Twist Drill Co. and largely responsible for the development of the molybdenum-tungsten high speed steels known as Mo-Max, has prepared a general description of these new steels. Bulletin Ka-103.

Ni-Cr Castings—Compositions, properties, and uses of the high nickel-chromium castings made by The Electro Alloys Co. for heat, corrosion and abrasion resistance are concisely stated in a handy illustrated booklet. Bulletin Fx-32.

Abrasive Cleaning—Comprehensive information on airless abrasive metal cleaning is contained in a book on the "Wheelabrator" Tumblast, a patented mechanical device made by the American Foundry Equipment Co. Fa-112.

Tool Steel Guide—A 36-page booklet which gives a clear picture of the entire range of tool steels and their fields of use, plus a systematic method for selecting the right steel for the purpose, is being released by Bethlehem Steel Co. Bulletin Bc-76.

Cadalyte "39"—A new technical service manual on CADALYTE "39" for cadmium plating has been issued by the Electroplating Division of duPont. Cites recent improvements and changes in the product, and gives detailed operating instructions and methods of analyses. A table of costs and time required for specified deposits is included. Bulletin Gb-29.

Lectromelt Furnaces—The story behind lectromelt furnaces is well told in this 48-page booklet issued by the Pittsburgh Lectromelt Furnace Corporation. Tells of development and recent improvements. Bulletin Db-18.

High Frequency—The well-known Ajax-Northrup electric furnaces are excellently catalogued in a 22-page book, which covers all sizes and types for laboratory or shop. Includes illustrations, diagrams, tables and charts. Ajax Electrothermic Corp. Bulletin Ia-41.

Neophot—"Neophot" is the name of a metallograph of radically different design and universal adaptability. A pamphlet distributed by Carl Zeiss, Inc., gives its applications and features and is well illustrated with beautiful samples of micrographic work. Bulletin Jx-28.

Hardness Testing—A 4-page folder which has as its purpose "to give you an idea of how practical a thing it is to make hardness tests on raw stock or fabricated metal parts in all plants where metal is worked, and to suggest something of the necessity for making such tests, or at least their importance" is available through the Wilson Mechanical Instrument Co., Inc. Bulletin Fb-22.

Lubrication—Intensive research which completed important improvements in the field of heavy-duty gear and bearing lubrication is tabulated in a new 12-page illustrated bulletin just released by D. A. Stuart Oil Co., Ltd. Lb-118.

The Review
7016 Euclid Ave., Cleveland

Please have sent to me without charge or obligation the following literature. (Circle the numbers that interest you. It is important to write in your company or business connection when you return this coupon.)

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Dy-135	Ec-225					Cb-19	Lb-118				

For Free Booklets

Easy Flow Brazing—Handy & Harman's Easy-Flo Brazing Alloy, a recent development, is recommended for joining stainless steel and iron, Monel metal, Inconel, Everdur and other ferrous and non-ferrous metals. Briefly described in Bulletin Ny-126.

Seamless Tubes—Prepared by the Timken Steel and Tube Division of Timken Roller Bearing Co. is a "Guide for Users of High Temperature Steels," which presents technical data relating to the various properties of Timken seamless tubes. Bulletin Bb-71.

Stainless Data Book—All users of stainless and heat resisting alloys should find invaluable the information contained in a booklet published by Maurath, Inc., giving complete analyses of the alloys produced by the different manufacturers, along with the proper electrodes for welding each of them. Bulletin Jy-125.

Galvanizing—An informative, historical, simple digest of galvanizing forms a guide to longer life for iron and steel products. This handsome, handy, 24-page book beautifully printed in color is distributed by American Hot Dip Galvanizers Association, Inc. Bulletin Ea-167.

Defi Rust—Analysis and descriptive notes of nine types of heat and corrosion resisting steels made by Rustless Iron and Steel Co. are contained in a handsome folder. Bulletin Ha-169.

Carburizer—Modern is the furnace and modern is the catalog which describes it. Hevi Duty Electric Co. has an exceptionally well-written, well-illustrated, and artistically printed booklet on the Hevi Duty carburizer which uses the Carbonol process. Bulletin La-44.

Welding Procedures—Procedures for producing all types of welds in mild steel, for welding all metals used to any extent industrially and for applying surfacing metal to meet any type of wear-action in service . . . in a booklet by The Lincoln Electric Co. Bulletin Bc-10.

Flame Hardening—A 10-page illustrated booklet "Flame Hardening", published by The Linde Air Products Co., describes the process whereby the surface of an iron or steel product is locally heated by means of an oxy-acetylene flame and then hardened by rapidly quenching in water, leaving the core of the metal tough and ductile. Bulletin Hb-63.

Metals for Corrosion—Fourteen varieties of Midvaloy corrosion and heat resisting metals are described in a detailed bulletin by The Midvale Co. Properties and applications are listed and illustrated. Bulletin Ca-160.

Insulation—A 32-page catalog containing specific information on all of the sheet, block and pipe insulations developed by the Johns-Manville Company is now available through that company. Bulletin Fb-100.

Cu and Cu Alloys—A brief summary of the important properties and typical industrial uses of 30 representative coppers and copper base alloys has been made available through Revere Copper and Brass, Inc. Bulletin Fc-239.

Speed Chart—A helpful lathe chart which gives recommended speeds for cutting steels of any range of hardness with Kennametal, the new carbide tool bit tip material, has just been issued by McKenna Metals Co. Bulletin Fc-238.

Copper Brazing—The important things to watch in Copper Brazing are described in a circular released by The Electric Furnace Co. Write for this aid to better brazing results. Bulletin Fc-30.

Controlled Valves—An illustrated 27-page booklet, just issued by The Foxboro Co., describes the two generally used types of air-operated controlled valves. Bulletin Fc-21.

Flexible Tube—The American Brass Co. has just perfected a seamless flexible metal tubing which is fully described in a 24-page booklet just released. Bulletin Fc-89.

Ampco Data—An interesting bound volume of Ampco Engineering Data Sheets which give performance records and details about the six grades of Ampco Metal is now available. Fc-175.

Flow Ratio Control—Automatic control of the rate of flow of one fluid in definite ratio to the flow of a second fluid is accomplished through the new Flow Ratio Controller just developed by the Bristol Co. Bulletin Fc-87.

Firebrick—Technical data on B&W insulating firebrick can be obtained through the Babcock & Wilcox Co. Bulletin Fc-75.

Rexalloy Tool Bits—An interesting booklet on Crucible Steel Company's new non-ferrous cast cutting Alloy, now available in Tool Bit form. Examples of increased speeds and deeper cuts made possible with Rexalloy are shown. Fc-56.

Bronze Bearings—An elaborate 72-page catalog dealing with bronze bearings of every size and quantity is now available through the Johnson Bronze Co. Helpful to anyone interested in bronze uses. Bulletin Fc-237.

Plating Rack Covering—A new product which resists chemically all the cleaning, pickling, and plating solutions used in electroplating, including chromium—making it especially suited to rack covering—is described in a release by Hanson-Van Winkle-Munning Co. Bulletin Fc-236.

Micro-Metallograph—A new Micro-Metallograph "MM-2" with arc lamp is described in detail in a recent catalog by E. Leitz, Inc. Bulletin Fc-47.

Most Complete List—What is believed to be the most complete list of publications in the world on Spectroscopy coming from any one concern is available through the Jarrell-Ash Co. Bulletin Fc-96.

Double Strength Steel—A large fund of authentic information on Republic Steel Corp.'s double strength steel is contained in an article by Howard L. Miller reprinted from Metal Progress. This steel promises wide application where a high tensile steel is required. Ox-8.

Zinc Castings—Zinc alloy die castings in business machines have progressed mightily during the past year and some of the leaders are shown in a booklet by the New Jersey Zinc Co. Bulletin Fc-228.

Gas-Fired Furnaces—Standard Rated Gas-Fired Furnaces produced by Surface Combustion Co. are included in a new catalog just released by this organization. Bulletin Fc-51.

Electric Valves—Self-contained valves with remarkable features are described in a new release by Wheelco Instruments Co. Fc-110.

Stock List—A highly-valued stock list of products made by the Scully Steel Products Co. is now available. Handsomely bound with spiral wire binding, this list gives instant reference for steel stocks. Bulletin Fc-79.

Cinch Steel Cement—How Cinch steel cement saves high speed steel and Stellite by permitting the using up of short pieces is told in a bulletin by Claud S. Gordon Co. Bulletin Ka-53.

Aluminum—Data on all the properties and commercial forms of aluminum are contained in a booklet released by the Aluminum Company of America. Explains best alloy for each purpose. Bulletin Lb-54.

Flow Meter—"Steam saved in the Boiler-room is Wasted in the Plant" is the theme of a colorful folder issued by the Brown Instrument Co. Shows savings in generation and distribution of steam. Bulletin Fc-3.

Grinding Cemented Carbides—A complete and detailed treatise on this important problem has been issued by the Carborundum Co. Special wheels and grits for the various commercial grades of carbides are given and many practical pointers are included. Nv-57.

Vanadium Castings—A 24-page bulletin well illustrated with more than 20 photographs contains a complete description of the properties and applications of a number of vanadium alloy steels for castings where high strength is required without excessive weight or high cost. Vanadium Corp. of America. Bulletin La-27.

Indianapolis Honors Its Past Chairmen at Dinner

By R. A. Thompson

Indianapolis Chapter held its final meeting of the season at the Washington Hotel on May 15.

It was preceded by an afternoon plant visitation to the Fairmount Glass Works, producers of bottles of all sizes. Approximately 100 guests and members visited the plant.

Past chairmen of the Chapter were honored at this meeting, and a number of the older members were in attendance, including Harry Hayward, chairman in 1921.

W. R. Chapin, A. E. Focke, Robert Fitzsimons, S. A. Silbermann, and Carl J. Winkler were among the other past chairmen present.

The new officers for the coming year were elected, and installed by Dr. Focke, acting as master of ceremonies.

He presented the new chairman, Robert Heath, with a gavel. Vice-Chairman Daniel Nelson was also presented with a token for his office, and the new secretary, P. B. Jensen, was presented with a large pencil so that he could communicate with the members frequently.

Failures Are Necessary Archer Tells Cleveland

By G. J. Hales

Cleveland Chapter—Bob Archer, pioneer Cleveland Chapter chairman, now at Chicago, was introduced by Cleveland's incoming chairman, Harry Churchill, at the meeting on May 1.

His talk on "Service Failures" was enjoyed by 450 who learned that failures are necessary. Once the type and severity of failures are established, the parts can then be properly designed to protect these weak points.

The old alibi of "inclusions" makes a good screen to hide behind but seldom is the real cause of failures. One of the most important things to watch is scratches or minute notches.

Too often the material selected for a job is not the best available for a particular application.

In looking for the reasons a service failure occurs, look for the simple and obvious reasons—don't make it too mysterious.

Slides showing actual parts that had failed in service were shown, explained and discussed. Our friends McQuaid and Johnson of Republic led an informal and active discussion.

Reunion of Former Chairmen Celebrated

Past Chairmen Philadelphia Chapter: C. H. Stoeckle, F. B. Foley, W. B. Coleman, Horace Knerr, Norman L. Mochel, James R. Adams, J. J. Crowe, Henry B. Allen, Gustaf Peterson, Thomas J. Moore and George W. Keller.

Below—Dinner Speaker Edward L. Reilly, Chairman A. O. Schaefer, Technical Speaker Norman L. Mochel, and H. P. Rassbach.

Mochel's Talk on Non-Ferrous Metals Judged His Finest

Reilly Gives Persuasive Dinner Speech on Insurance

By A. O. Schaefer

Philadelphia celebrated the reunion of its former chairmen with all due solemnity on the occasion of its regular April meeting.

At least 11 of those honored by that office gathered for the occasion, including such well-known Chapter celebrities as Charlie Stoeckle, Frank Foley, Bill Coleman, Horace Knerr, Norman Mochel, Jim Adams, Jack Crowe, Henry Allen, Gus Peterson, Tom Moore, and George Keller.

From the spirited conversation and laughter evident at the end of the speakers' table reserved for these honored guests, the pleasure was not entirely one-sided. It is only fair to remark that all past chairmen make their bows with spirit and éclat, and are always roundly applauded by the appreciative membership.

In complete fitness with the occasion was the address by Norman L. Mochel, metallurgical engineer of the Westinghouse Electric and Mfg. Co., on "Applications of Non-Ferrous Metals".

In the first place the speaker is himself a past chairman. In the second place he has earned the distinction of being Philadelphia's favorite speaker. Hardly a year goes by that the name of Mochel is not included in the list of speakers at Philadelphia meetings. Furthermore, the meetings he addresses are usually the best attended of the season.

This year's contribution was no exception. Indeed, many feel that this talk on non-ferrous metallurgy is the speaker's finest. Certainly no more comprehensive talk on the subject could be given, and again the speaker demonstrated his ability to hold his audience's attention to the last word of his talk.

A feature of this meeting was the tabulation of votes for the next year's officers.

Edward L. Reilly proved to be a dinner speaker of rare charm and persuasiveness. His talk on "Your Economic Problem and Mine" was, of course, one of compelling interest. His absolute proof that life insurance costs nothing, and leaves the insured with increased spending money, left his audience of mere technical men amazed.

A further feature of an outstanding meeting was John Casner's orchestra which played at intervals during dinner. Philadelphia is just uncovering the versatility of its members.

Non-Destructive Test Methods Outlined

By G. E. Healy

Oregon Chapter—At the annual meeting on May 12 the chairman announced that due to the illness of President Woodside the meeting scheduled for the latter part of May would be cancelled and that a meeting was planned at which time the student prize award would be made.

He expressed his appreciation of the cooperation given him by the members during the past year.

After election of officers awards of certificates showing the name of the past chairman and the year of his service were made to S. H. Graf, chairman 1937-1938, and Retiring Chairman W. J. Ulrich.

Mr. Graf then delivered a paper on "Industrially Significant Non-destructive Testing Methods for Engineering Materials and Machine Parts".

Professor Graf stated that while some testing methods used in the materials testing laboratory are carried out to the complete destruction of the part, many methods of testing have been developed which will give a good index to the physical properties of materials without damage to the part tested.

He outlined the various test methods used, such as hardness test, polarized light, spectrograph, X-rays, magnetic testing, and the Magnaflux method for locating hidden cracks in various parts.

After the paper, those present enjoyed a four-act vaudeville show.

Hartford Members See Manufacture of Electric Appliances

By R. J. Haigis

Hartford Chapter—A varied and interesting program was offered to the members and guests on Tuesday afternoon and evening, May 9.

Through the courtesy of the Arrow, Hart and Hegeman Electric Co., who opened their plant for inspection between the hours of 1:30 and 4:00 p.m., it was possible to see first hand the multitude of operations and processes which go into the making of electrical switches and similar appliances.

With guides furnished for each ten or twelve men, the Company did an excellent job.

At 4:30 the group adjourned to the Chemistry Auditorium of Trinity College where A. P. R. Wadlund spoke on the subject of "X-Rays and Their Industrial Application".

Dr. Wadlund, who is associate professor of physics at Trinity College, gave a most interesting talk on the three general methods of X-ray inspection—namely, fluoroscopic, radiographic and diffraction. He started with the fluoroscopic inspection of beans, candy bars, golf balls and oranges, passed through the radiographic inspection of castings, the diffraction methods as applied to various metals and ended with the role of X-rays in medicine.

After an interesting discussion period, the group adjourned to the dining hall at Trinity College where a most excellent dinner was served in the dignified atmosphere of one of New England's nicer small colleges.

At the conclusion of the meal, M. J. Donachie, an executive of Springfield Chapter, entertained the group with feats of Scotch magic.

European Trip Described; Movie and Talk Show Construction of Aqueduct

By James Patterson

Los Angeles Chapter—At the April meeting John Disario, past chairman of the Chapter, presented a short coffee talk on his recent trip to Europe. His talk was chiefly confined to conditions in Italy where he spent the major portion of his time.

Mr. Disario discussed the living conditions of the average family in Italy and described in detail the daily life of the peasants living in rural districts. He told of visiting a large foundry in the northern part of Italy and compared their methods of production with those in the United States.

At the conclusion of Mr. Disario's talk a motion picture entitled "The Thirteen Golden Cities" was shown through the courtesy of The Metropolitan Water District of Southern California.

The picture depicted the life of the early Californians living upon their large ranchos 100 years ago and described the ever-growing menace of a destructive drought in Southern California which is a semi-arid region—the average rainfall being far below its needs.

A bond issue of $200,000,000 was voted to finance the construction of the giant Metropolitan Aqueduct and an army of 35,000 workers built the world's largest domestic water supply system—392 miles in length and including 108 miles of hard rock tunnels.

At the conclusion of the picture two representatives of The Metropolitan Water District discussed many of the engineering obstacles encountered in the building of this Aqueduct and answered questions raised by several members present.

Regional Meeting Is Held in New England

(Continued from page 1)

given to recent developments in the precipitation hardening types, particularly the copper-chromium alloys and the beryllium-copper alloys. The speaker discoursed at length upon the unique properties of these materials, and the method of heat treatment and cold working required to bring out their best physical properties.

The lengthy discussion which followed showed evidence that the New England metallurgists are more than merely curious about these materials.

Mr. Foley's dissertation on stainless steel was opened with a review of the chromium-bearing steels and some alloys particularly suited for corrosion and oxidation resistance.

The phenomenon of carbide precipitation and intergranular attack on stainless steel was the main theme of the speaker's talk, with a large assortment of slides illustrating a series of experiments on the effect of heat treatment on carbide precipitation and corrosion resistance.

Despite a large crowd and a well-stocked bar, the dinner started on time. To the accompaniment of an orchestra, the crowd indulged in singing popular songs old and new. The spontaneous singing of individual groups and the general din that filled the air were resonant with good fellowship.

With the inner man satiated, Chairman Morris presided, and introduced Mayor Putnam of Springfield who gave the welcoming address to the visitors.

National Secretary Bill Eisenman followed the Mayor, providing a treat with his stories and anecdotes, whilst introducing the dinner speaker, Col. F. H. Payne of the Greenfield Tap and Die Corp.

Colonel Payne devoted his address to the timely subject of preparedness, national defense and the importance of metals and man in this scheme of things. This presentation and the convincing delivery of it by the speaker reached out to the audience and brought home the thought that this vital subject was as much personal as national business.

With the closing of the official program, the extra-curricular festivities went off to a flying start. Hotel Kimball was probably never better supported, since many New England pillars of metallurgy were holding up the basement (where the bar is!)

Continental Roll Adds to Plant

The Industrial Equipment Division of the Continental Roll & Steel Foundry Co., East Chicago, Ind., has announced the acquisition of the Howell Engineering Co., St. Charles, Ill., manufacturers of automatic polishing and buffing equipment made under the B. F. Bower patents and patents pending.

Complete production of these products will be at the company's East Chicago plant; the Coraopolis, Pa., and Wheeling, W. Va., plants will concentrate on the company's products for the steel and other industries, and steel castings in general.

FOR SALE

Complete large Leitz Metallographic Microscope, inverted type with 8 x 10 in. camera, complete optical equipment with apochromatic objectives and Periplan eyepieces, table stand with vibration absorber. Has been used but in good working order. 1929 model.

Listed at approximately $1600—will sell for $750.

Spindler & Sauppe, Inc.
86 Third St., San Francisco, California.

Comparative Membership Standings of the Chapters

The following list shows the relative membership as of June 1 of the various chapters of the American Society for Metals. The actual membership of each chapter is not given, the figures merely representing the number of members each chapter has less than the chapter listed next above. The numbers in parentheses indicate the relative position of each chapter last month.

(1) Chicago	Largest	(24) Worcester ...	1
(2) Pittsburgh	45	(28) Dayton	8
(3) Detroit	63	(26) North West ..	3
(4) Cleveland	93	(27) Tri-City	1
(5) Philadelphia ..	69	(29) Schenectady ..	5
(6) New Jersey	161	(30) Columbus	7
(7) New York	13	(31) Oregon	3
(8) Boston	76	(34) Baltimore	2
(9) Montreal	42	(32) St. Louis	3
(10) Ontario	4	(33) York	0
(11) Milwaukee	28	(35) Syracuse	7
(14) New Haven ..	16	(36) Rhode Island .	6
(12) Lehigh Valley	1	(37) Indianapolis .	2
(15) Rochester	4	(38) Mahoning Valley	0
(13) Los Angeles ..	1	(39) Penn State ..	5
(16) Cincinnati ...	19	(40) Springfield ..	5
(17) Texas	3	(41) Notre Dame ..	10
(19) Peoria	15	(43) Southern Tier.	9
(18) Golden Gate ..	7	(44) Rockford	2
(20) Hartford	5	(42) Puget Sound ..	1
(21) Buffalo	4	(45) Mich. Col.M.T.	5
(22) Washington ...	16	(46) Muncie	4
(23) Canton-Mass. ..	5	(47) Mo. Sch.M.M.	13
(25) Calumet	3	(48) Va. Poly. Inst.	20

Students Visit Arsenal As Guests of Milwaukee

By G. K. Dreher

Milwaukee Chapter and guest students from the University of Wisconsin and University of Marquette visited the Rock Island Arsenal on Friday, May 19, for inspection of operations at that plant. About 125 were in the party.

Although the day was exceedingly warm, the entire group stuck by their guns until the tour was over at four o'clock in the afternoon.

All of the operations at the Arsenal were witnessed. Among them were the new welding shops, the machine gun division, the machine shop, heavy machinery department, tank assembly and erecting floor, and anti-aircraft mounts assembly floor.

In addition, a visit to the forge shop and metallurgical laboratories revealed a hitherto unsuspected range of operations in these fields at the Arsenal. A 500,000-volt X-ray machine, as well as Magnaflux testing equipment are in regular use, along with many other pieces of equipment.

The Milwaukee Chapter owes its thanks to Col. Ramsey, commanding the Rock Island Arsenal, as well as to Mr. Baumbeck in charge of manufacture, for the competent guides provided for the tour. Arrangements for the tour were made by W. J. Sparling of the Milwaukee Chapter and his committee.

Employment Service

Address answers care of A.S.M., 7016 Euclid Ave., Cleveland, unless otherwise stated

Position Open

SALESMAN for bronze foundry: Must have broad selling experience in non-ferrous field. Give list of present and previous employment, territory covered, education, age, references, salary expected. Box 6-5.

Positions Wanted

METALLURGICAL ENGINEER: 24; graduate of Colorado School of Mines, 1938. Desires position paying fair salary and chance to use his own ability; preferably in stainless steel research. Experienced in process metallurgy in large steel company. Married; good health. Box 6-10.

CHEMICAL ENGINEER: Graduate University of Detroit, five-year course, 1939; age 21. Worked three years in aluminum plant on cooperative plan. Familiar with heat treating, casting, and physical testing practices. Location in Detroit area preferred. Box 6-15.

METALLURGIST AND CHEMIST: B.Ch.E., M.S.E. Univ. of Mich. 20 years in charge of chem. and met. laboratory and heat treating department of metal cutting tool plant; thoroughly familiar with routine analysis, metallography, hardness testing, heat treating alloy and high speed steel. Heat treating foreman or sales work considered. Box 3-50.

Albert Sauveur

A Revered Name

The personal autograph of the late Albert Sauveur, Gordon McKay Professor of Metallurgy and Metallography in Harvard University is contained in the few remaining copies of his "Metallurgical Dialogue" which are still available for sale.

This unique book uses an informal presentation to cover such subjects as red shortness, alloy steel, cold work, high speed steel, corrosion, and stainless steels. Valuable historical material and a complete review of the various theories of hardening steel are included.

This is a book you will treasure — autographed by the most revered man in metallurgy. Write today for your copy — only a few remain.

Price, $3.00

AMERICAN SOCIETY FOR METALS 7016 EUCLID AVE. CLEVELAND, OHIO

● Please send me a personally autographed copy of "Metallurgical Dialogue." I am enclosing cash ( ), money order ( ), check ( ), purchase order ( ) for $3.00.

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